

REMARKS

At the outset, applicants would like thank Examiner Maier for her time and consideration of the present application at the interview on February 11, 2004 with the undersigned attorney. At the interview, the issues raised in the outstanding Official Action were discussed.

Claims 16-29 are pending in the present application. Claim 15 has been canceled. Claim 16 is now an independent claim. Claim 16 has been amended to incorporate all the recitations of claim 15. Moreover, claim 16 recites that the oxidized carbohydrate contains on average 0.1-1.5 carboxyl groups and 0.5-1.9 aldehyde groups per oxidized 1,2-1,2-dihydroxyethylene group.

Claim 18 has also been amended as an independent claim. Claim 18 recites all of the recitations of former claim 15 and recites that the oxidized carbohydrate contains on average 0.1-1.2 carboxyl groups and 0.3-1.2 aldehyde groups per repeating unit.

Claims 15-19 were rejected under 35 US §102(b) as allegedly being anticipated by LEROY et al. This rejection is respectfully traversed.

Applicants believe that LEROY et al. fail to anticipate or render obvious the claimed invention. LEROY et al. describe a

starch product containing both carbonyls and carboxyls. However, LEROY et al. do not give any indication as to the nature of the carbonyls, which, in principle, could be aldehydes or ketones. Moreover, LEROY et al. do not disclose the product analysis methods used.

Rather, LEROY et al. only briefly state that the oxidation of terminal hydroxy groups (i.e., CH₂OH) results in carboxyl groups and that the oxidation of chain groups (i.e., -CHOH-) results in keto groups (col. 3, lines 36-40). This is stated in regards to the side chains and starch derivatives, such as dihydroxypropyl starch and not to the starch chains themselves. This would be consistent with the finding that hypohalite oxidation at the 2- or 3- positions, leads to keto groups (no detectable aldehydes), and that hypohalite oxidation at the 6-positions (terminal groups) may lead to aldehydes and carboxyls. Thus, in view of the above, applicants believe that one of ordinary skill in the art would conclude that the carbonyls must be either keto groups at the 2- or 3-positions, or aldehyde groups at the 6-positions, but not aldehydes at the 2- or 3- position.

While the Official Action cites to MASKASKY as a showing of a ring-opening oxidation of polysaccharides by hypochlorite or hypobromite, applicants believe that the MASKASKY publication fails to remedy the deficiencies of LEROY et al. The

explanation given on ring-opening oxidation of starch in column 8, lines 16-49, is the generally accepted mechanism for periodate oxidation, but not for hypohalite (hypobromite or hypochlorite).

Although the mechanism hypohalite oxidation of starch is not known in every detail, there is firm agreement that it does not follow the periodate route, which is demonstrated by the fact that aldehyde groups of dialdehyde starch cannot be oxidized to carboxyl groups, whereas starch itself can be oxidized to dicarboxy starch (see products shown in col. 8, lines 40-45 of MASKASKY).

Moreover, neither publication cited by MASKASKY in column 9 supports a dialdehyde intermediate in the hypohalite oxidation of starch. Thus, the LEROY et al. and MASKASKY publications, alone or in combination with each other, do not describe the claimed invention, which recites starch products having both the aldehyde and carboxyl groups at the 2- and 3-position. The publications by no means describe or suggest the specific aldehyde/carboxyl ratios recited in the claimed invention.

In view of the above, applicants believe that LEROY et al. fail to anticipate or render obvious the claimed invention.

Claims 15 and 20 are rejected under 35 USC §102(b) as allegedly being anticipated by BATTISTA et al. Applicants believe that the present amendment obviates this rejection.

As noted above, claim 15 has been canceled. In addition, claim 20 has been amended so it is now dependent on claim 16. Thus, as a result, applicants believe that the present amendment obviates this rejection.

As the Examiner is aware, claims 22-29 have been withdrawn from consideration. Claims 22-26 are directed to a process for producing oxidized carbohydrates. Claims 27-29 are directed to an amino-substituted oxidation product derived from a carbohydrate containing 1,2- dihydroxyethylene groups and its repeating units.

At this time, applicants request that claims 22-29 be rejoined with claims 15-19. As the Examiner is aware, if an application as originally filed discloses claims directed to the product and the process for making and/or using the product, and claims directed to the product are elected for examination, applicant may present claims directed to the process for making and/or using the patentable product by way of amendment pursuant to 37 CFR §1.121 when the product claims are found allowable.

Process claims which depend from, or otherwise include all the limitations of the patentable product, will be entered as a matter of right in the amendment as presented prior to a final rejection or allowance. Since process claim 22 has been amended to incorporate the subject matter of product claim 16, applicants believe that claim 22 should be rejoined with product claims 16-

19. As claims 23-25 are dependent on claim 22, applicants believe that these claims should be examined with claims 16-19 and 27.

Moreover, applicants note that while claim 26 is directed to a process for producing an oxidized, amino-substituted carbohydrate, claim 26 recites a process step of reductively aminating residual aldehyde groups in the oxidized carbohydrate obtained by the process according to claim 22. Thus, applicants believe that claim 26 should also be examined with claims 16-19 and 22-25.

As claims 27-29 are directed to an amino-substituted oxidation product derived from a carbohydrate containing 1,2-dihydroxyethylene groups and its repeating units, applicants believe that claims 27-29 should be examined with claim 26 along with claims 16-19 and 22-25. Thus, in view of the above, applicants believe that claims 22-29 should be rejoined with claims 15-19.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance, with claims 16-29, as presented. Allowance and passage to issue on this basis are accordingly respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

Application No. 09/830,871
Amdt. dated May 7, 2004
Reply to Office Action of September 8, 2003
Docket No. 2001-1112

overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. §1.17.

Respectfully submitted,

YOUNG & THOMPSON

Philip A. Dubois

Philip A. Dubois, Reg. No. 50,696
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

PD/mjr
May 7, 2004